PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

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PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing *(day/month/year)*	23.08.2004
Applicant's or agent's file reference: SCB 810 PCT	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/EP 03/11913	27.10.2003	30.10.2002

Applicant: FRUCTAMINE S.P.A. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the international preliminary examining authority:	Authorized Officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Siefert, A Tel. +49 89 2399-2469

Form PCT/IPEA/416 (January 2004)

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference SCB 810 PCT	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP 03/11913	International filing date *(day/month/year)* 27.10.2003	Priority date *(day/month/year)* 30.10.2002
International Patent Classification (IPC) or both national classification and IPC C07H19/20		
Applicant FRUCTAMINE S.P.A. et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
17.05.2004	23.08.2004
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Bardili, W Telephone No. +49 89 2399-2132

Form PCT/IPEA/409 (Cover Sheet) (January 2004)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/11913

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-12 as originally filed

Claims, Numbers

1-13 received on 05.08.2004 with letter of 03.08.2004

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-13
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-13
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V

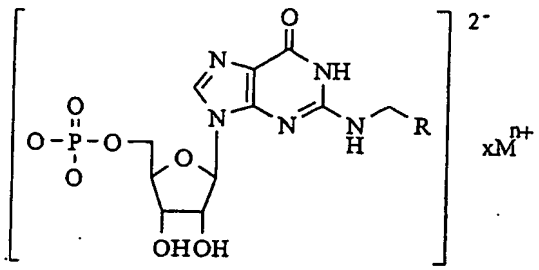
Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Some nucleoside monophosphates are well-known flavour enhancers, in particular when used in combination with glutamate (see D1/ Chem. Pharm. Bull. 16, 338 (1968)). One example is guanosine monophosphate. To improve the efficiency of these flavour enhancers modified nucleoside phosphates have been suggested in the prior art D1 and D2/ US-A3 408 206, for instance 2-N-methyl guanosine-5'-monophosphate. The compounds of claim 1 differ from the known flavour enhancer in that further specific substituents are present at the 2-N-.methyl group.

Although D1 describes the relationship between structure and seasoning activity of several nucleoside phosphates, not much was known about the structural requirements at the 2-N-position. The properties of the claimed compounds appear therefore unexpected.

CLAIMS

1. Compounds of general formula (I)



(I)

wherein R is:

- C_1-C_4 alkyl, optionally substituted with an S-R^1 group, in which R^1 is C_1-C_3 alkyl;
- a phenyl, benzyl, thiophenyl or benzothiophenyl group, optionally substituted with 1-5 substituents, preferably 1 to 3 substituents, which can be the same or different, selected from -NO_2, -CHO, -R^1 or -SR^1 groups, in which R^1 has the meaning defined above;

M is hydrogen, an alkali or alkaline-earth metal;

X is 1 when n is 2 and X is 2 when n is 1

with the exclusion of the compounds of formula (I) wherein R is methyl or propyl.

2. **Compounds as claimed in claim 1 wherein R is straight C_1-C_3 alkyl substituted with an S-R^1 group, in which R^1 is methyl.**

3. Compounds as claimed in claims 1, wherein R is a phenyl, thiophenyl or benzothiophenyl group, optionally substituted with an -NO_2, methyl or -SR^1 group, in which R^1 is as defined in claim 1.

4. Compounds as claimed in any one of claims 1 to 3, wherein M is

hydrogen, sodium, potassium, calcium, magnesium or barium.

5. Compounds as claimed in claim 1, wherein M is hydrogen, sodium, potassium, calcium, magnesium or barium and R is:

- **straight C_1-C_3 alkyl substituted with a -SCH_3 group;**
- a phenyl, thiophenyl or benzothiophenyl group, optionally substituted with an -NO_2, methyl or -SCH_3 group.

6. Compounds as claimed in any one of claims 1 to 5 in which M is hydrogen or sodium.

7. A compound **as claimed in claim 1 which is** selected from:

N^2-(3-methylthio)-propyl guanosine-5'-monophosphate;

N^2-(4-methylthiophenyl)-methyl guanosine-5'-monophosphate;

N^2-(2-methylthiophenyl)-methyl guanosine-5'-monophosphate;

N^2-thiophen-2-yl-methyl guanosine-5'-monophosphate;

N^2-thiophen-3-yl-methyl guanosine-5'-monophosphate;

N^2-(5-methylthiophen-2-yl)-methyl guanosine-5'-monophosphate;

N^2-(3-methylthiophen-2-yl)-methyl guanosine-5'-monophosphate;

N^2-(3-ethylthiophen-2-yl)-methyl guanosine-5'-monophosphate;

N^2-(3-nitrothiophen-2-yl)-methyl guanosine-5'-monophosphate;

N^2-(thianaphthen-3-yl)-methyl guanosine-5'-monophosphate

and the corresponding sodium salts.

8. **A compound as claimed in claim 7 which is** N^2-(3-Methylthio)-propyl guanosine-5'-monophosphate and the corresponding sodium salt.

9. The use of the compounds as claimed in any one of claims 1 to 8 as flavour enhancers in food preparations.

10. The use of the compounds as claimed in any one of claims 1 to 8, alone or in combination with monosodium glutamate and/or with 5'-monophosphate nucleotides, as flavour enhancers in food preparations.

11. The use as claimed in claim 9 or 10 for the preparation of pasta, risottos,

soups, dried and wet soups, snacks, sauces, salad dressings, ready-made red and white sauces, stock cubes, soup preparations, cooked and uncooked dressed meats, tinned meat, stuffed pasta and preserved vegetables.

12. Flavour enhancers comprising a compound of claims 1 to 8 in admixture with monosodium glutamate and/or with 5'-monophosphate nucleotides.

13. Food preparations containing the compositions of claim 12.